UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

June 7, 2000

Lori Morris, Project Manager
Department of the Army
Seattle District, Corps of Engineers
P.O. Box 3755
Seattle, WA 98124-3755

Re: Biological Opinion for Culvert Removal and Bridge Replacement in Wild Horse Creek, Kalama River, Washington, NMFS No. WSB-00-191

Dear Ms. Morris:

This document transmits the National Marine Fisheries Service's (NMFS) Biological Opinion (BO) based on our review of the proposed culvert removal and bridge installation in Wild Horse Creek, Cowlitz County, Washington and its effects on Lower Columbia River (LCR) chinook salmon, LCR steelhead, and CR chum salmon in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). Formal consultation for this project was initiated on April 19, 2000. This opinion also constitutes formal conference for LCR/Southwest coho salmon.

This BO is based on information provided in a Biological Assessment dated April 3, 2000. A complete administrative record of this consultation is on file at the Washington Habitat Branch Office.

The U.S. Corps of Engineers determined that the proposed project was likely to adversely affect LCR chinook salmon, LCR steelhead, and CR chum salmon. The enclosed document represents NMFS' Biological Opinion related to the effects of the actions on federally listed salmonids.

The NMFS concludes that implementation of the proposed project is not likely to jeopardize the continued existence of LCR chinook, LCR steelhead, CR chum or result in destruction or adverse modification of critical habitat. In your review, please note the incidental take statement, which includes reasonable and prudent measures and terms and conditions designed to minimize take and avoid jeopardy.

If you have any questions, please contact Sam Brenkman of the Washington State Habitat Branch Office at (360) 534-9338.

Sincerely,

For Michael R Crouse

William Stelle, Jr.
Regional Administrator

Enclosure
cc: Cowlitz County - Roger Maurer

Endangered Species Act-Section 7 Consultation

BIOLOGICAL OPINION

Culvert Removal and Bridge Installation in Wild Horse Creek, Kalama River, Washington
WSB-00-191

Agency: United States Department of the Army, Corps of Engineers

Consultation Conducted By: National Marine Fisheries Service
Northwest Region
Washington State Habitat Branch

Approved Michael R. Crouse for Date June 12, 2000

William W. Stelle, Jr.
Regional Administrator

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I. BACKGROUND INFORMATION

A. Consultation History

This document transmits the National Marine Fisheries Service's (NMFS) Biological Opinion (BO) based on our review of the proposed project to replace a box culvert with a bridge in Wild Horse Creek, near Kalama, Cowlitz County, Washington. The Corps of Engineers (COE) is the lead agency and has concluded that the proposed actions are likely to adversely affect Lower Columbia River (LCR) steelhead trout (*Oncorhynchus mykiss*), LCR chinook salmon (*O. tshawytscha)*, and Columbia River (CR) chum salmon (*O. keta*). The Cowlitz County Department of Public Works is the applicant and will administer the construction and monitoring.

The objective of this BO is to determine whether the proposed action is likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of designated critical habitat. This opinion was completed pursuant to the Endangered Species Act (ESA) and its implementing regulations (50 CFR 402) and constitutes formal consultation for LCR steelhead, LCR chinook, and CR chum salmon. Additionally, this opinion constitutes formal conference for candidate LCR/Southwest coho salmon.

The NMFS received information necessary to conduct formal consultation on April 19, 2000. The BO is based on information provided in the Biological Assessment (BA) dated April 3, 2000 and the following correspondence: on April 6, 2000, NMFS staff received a BA from the COE; on April 19, 2000, NMFS staff visited Wild Horse Creek and discussed the project with Roger Maurer of Cowlitz County Department of Public Works; on April 24, 2000, NMFS received a copy of the updated Hydraulic Project Approval and a copy of a letter from Cowlitz County Department of Public Works regarding comments from NMFS; and numerous telephone conversations occurred between NMFS staff and Cowlitz County staff on April 21, April 24, April 25, April 26, and May 3, 2000.

B. Description of Proposed Action

The Cowlitz County proposes is to replace a box culvert with a single span bridge (92.5 ft clear span) in Wild Horse Creek, a tributary to the Kalama River, Washington (NW Section 36, Township 7 N, Range 1 East; milepost 16.12 on Kalama River Road). The goal of the project is to eliminate a seasonal barrier to fish migration and subsequently increase the amount of available habitat in Wild Horse Creek by at least three miles and up to nine miles. The road culvert is presumed to be a barrier during certain flow conditions.

The following construction related activities will occur at the site:

1. Removal of Vegetation

To prepare for the realignment and widening of the road, the applicant proposes to remove 20,085 square feet of alder, cedar, spruce, hemlock, fir, alder and maple from both sides of the Kalama River Road and Wild Horse Creek (7,585 square feet within Wild Horse Creek and 12,500 square feet of riparian area on the Kalama River). A total of 36 trees will be removed that range in diameter from 6 to 30 inches.

2. Road and Bridge Construction

The applicant proposes to use one lane of the existing road to accommodate traffic during construction. The northern portion of the lane will be removed and a portion of the bridge will be constructed while traffic is routed to the southern lane. Five shafts (30 in. diameter) will be drilled ten feet below bedrock and filled with concrete. Upon completion of the northern portion of the bridge, traffic will be routed to that lane and construction will occur in the southern lane. Temporary approaches will be constructed at both ends of the bridge.
The widening and realignment of Kalama River Road will result in a net increase of ~4,300 square ft. of impervious surface. Storm water will drain west along road and into a vegetated roadside ditch that enters a lined swale before the water flows into Wild Horse Creek.

3. Excavation

Excavation will occur along Wild Horse Creek from the mouth to a point ~125 ft. upstream. Removal of sediment will occur during channel excavation (3,425 cubic yards), roadway excavation (1,250 cubic yards), and structural excavation (87 cubic yards). All channel excavation will occur during periods of low flow in the summer. Excavated materials will be hauled and secured off-site.

4. Sediment and Erosion Control

A total of 1,070 ft. of silt fence will be installed throughout the project area from the onset of the construction until spring 2001. There also will be plastic sheeting on-site that will be placed over barren soil in the event of excessive rainfall or high stream flows. The County inspectors will ensure that the silt fences function properly throughout the duration of the project. All project construction activities also will be monitored by a qualified fisheries biologist to ensure that the project impacts will be minimal to water quality in the Kalama River during and after construction.

Native trees and shrubs will be planted no later than October 7, 2000 along the river and creek in areas where vegetation was removed. The applicant proposes to plant the following numbers of each species from September 15 to November 1, 2000: (5) bigleaf maples; (3) Douglas firs; (8) western red cedars; (9) vine maples; (50) salal; (6) red elderberries; (25) lady ferns; and (15) sword ferns. Hydroseed also will be used on barren soils at the site. The project must be maintained as necessary to ensure an 100 percent survival of all plants by the end of year one and an 80 percent survival of all plants by the end of year five (October 31, 2005). An annual status report with photos must be submitted to the COE by October 31 of each year.

5. Installation of Rip Rap

The location of the bridge is considered to be in an area that is susceptible to abutment scour, lateral channel migration, and channel degradation. A total of 452 cubic yards of rip rap will be installed around the bridge abutments and on each side of Wild Horse Creek from the mouth to a point 105 feet upstream. Of that total, 220 cubic yards will be placed below the ordinary high water and within five feet of the channel. Rip rap will be installed on the west streambank before the construction of the water diversion and later will be installed on the east streambank immediately after the removal of the culvert. The toe of the rip rap will be placed three to five ft. below the existing stream bed. Installation of rip rap will occur throughout a period of five days.

6. Dewatering of Stream

A total of 2,520 square feet of Wild Horse Creek will be dewatered for up to 30 days (likely from August 1 to September 1, 2000). Sandbags will be temporarily placed at the upstream and downstream side of the culvert to keep the area dry during construction. Fish that are present in the culvert will be captured using dip nets and safely released into the Kalama River. Water will be piped through the construction area from a point immediately upstream of the culvert inlet in Wild Horse Creek to the Kalama River. To prevent injury to fish, the outlet of the diversion pipe will be located immediately above the Kalama River.

7. Removal of Culvert

After dewatering the site, the culvert will be removed and the remaining portion of the channel will be excavated and armored with rip rap. The box culvert that will be removed is 100 ft. in length, 9 feet wide, and 12 feet high. The excavated channel will be 18 feet wide at the bottom with 1.5:1 side slopes to approximately correspond to cross sections of unaltered portions of stream. The duration of construction activities related to building the bridge for use as one lane of traffic and the removal of the box culvert is 2.5 months.

8. Monitoring

A monitoring plan was developed to address changes in channel and bank stability along Wild Horse Creek. Additionally, the applicant will conduct surveys to determine the presence and relative abundance of fish upstream of the culvert after installation of the bridge. At present, there is a paucity of data on fish densities in the action area.

A descriptive and quantitative survey will be conducted once a year for three years to measure changes in the location and condition of the stream banks throughout time. The surveys will occur from the mouth of Wild Horse Creek to a point 200 feet upstream. More detailed descriptions of each monitoring measure can be found in David Evans and Associates (1999).

The proposed project includes the replanting of disturbed stream banks. Riparian vegetation planted along Wild Horse Creek will be inspected once a year for three years after construction. Survival of plants also will be determined.

To determine the extent of adult steelhead in Wild Horse Creek after installation of the bridge, redd surveys will be conducted from March 1 to May 1 over a three year period after construction. The surveys will occur in the creek from stream mile 0.0 to stream mile 2.3.

II. STATUS OF SPECIES AND CRITICAL HABITAT

A. Lower Columbia River Chinook Salmon

Lower Columbia River chinook salmon were listed as a threatened species under the ESA on March 24, 1999 (64 Fed. Reg. 14309). Critical habitat for LCR chinook was designated on March 9, 1998 (63 Fed. Reg. 11515) and the final listing occurred on February 16, 2000 (65 Fed. Reg. 7774). In Washington State, the LCR chinook ESU includes all naturally spawned chinook populations from the mouth of the Columbia River to the Cascade Crest.

Critical habitat in Washington is designated to include all river reaches accessible to chinook salmon in Columbia River tributaries between the Grays River and White Salmon River. Factors for decline of the LCR chinook were attributed to habitat degradation primarily related to forest practices, urbanization, hydroelectric dams, and agricultural practices (Table 1). The LCR chinook also have been negatively influenced by genetic introgression from artificial propagation (63 Fed. Reg. 11495; March 9, 1998).

B. Lower Columbia River Steelhead Trout

Lower Columbia River steelhead trout were listed as threatened under the ESA on March 19, 1998 (63 Fed. Reg. 13347). Critical habitat for steelhead was designated on February 16, 2000 (65 Fed. Reg. 7775). In Washington, the LCR steelhead ESU includes winter and summer steelhead in tributaries to the Columbia River between the Cowlitz River and Wind River, inclusive (Busby et al. 1996).

Nineteen stocks of steelhead within the LCR ESU were identified as at risk of extinction or of special concern (Nehlsen et al. 1991). There are several factors for decline of LCR steelhead including habitat degradation, overharvest, predation, hydroelectric dams, hatchery introgression, the eruption of Mount Saint Helens, and other natural or human-induced factors (NMFS 1996; Busby 1996). Urbanization, forestry, water diversions, and mining also greatly reduced habitat complexity or eliminated habitat. Essential features of critical habitat for steelhead include adequate substrate, water quality, water quantity, water temperature, water velocity, cover/shelter, food, riparian vegetation, and safe passage conditions. Recent and historical information related to abundance of steelhead is summarized in Busby et al. (1996).

C. Columbia River Chum Salmon

Columbia River chum salmon were listed as threatened under the ESA on March 25, 1999 (64 FR 14507). Critical habitat was designated on February 16, 2000 and includes accessible reaches of the Columbia River (including estuaries and tributaries) downstream from Bonneville Dam to the river mouth. Historically, chum salmon were abundant in lower portions of the Columbia River and supported annual harvests of hundreds of thousands of fish. Currently, relative abundance of chum salmon is likely less than one percent of historical levels and spawning is known to occur in only three streams (Hardy Creek, Hamilton Creek, and Grays River). Spawner surveys of chum salmon in three streams indicated that a few thousand to 10,000 chum salmon spawn each year in the Columbia River Basin (Johnson et al. 1997). It is believed that these chum populations have been influenced by hatchery programs and/or introduced stocks.

The factors for decline in naturally reproducing chum salmon populations are primarily attributed to habitat degradation, water diversions, harvest, dams, loss of estuarine habitats, and artificial propagation. Presently, there are no recreational or commercial fisheries for chum salmon in the Columbia River although some fish are incidentally taken in the gill-net fisheries for coho and chinook salmon. Essential features of chum salmon critical habitat include adequate substrate, water quality, water quantity, water temperature, water velocity, cover/shelter, food, riparian vegetation, and safe passage conditions.

D. LCR/Southwest Coho Salmon

Biological information and historical population trends may be found in Weitkamp et al. (1995).

Table 1. The following references contain specific information related to the listing status, life histories, and critical habitats for listed salmonids in Washington State (Table 1).

Fish Species and ESU	**Listing Status**	**Critical Habitat**	**Citations for Biological Information**
Lower Columbia River Chinook Salmon	Proposed-3/9/98; 63 Fed. Reg. 11482 Final-3/24/99; 64 Fed. Reg. 14308	Proposed-3/9/98; 63 Fed. Reg. 11482 Final-2/16/00; 65 Fed. Reg. 7774	Myers et al. 1998
Lower Columbia River Steelhead Trout	Final-3/19/98; 63 Fed. Reg. 13347	Final-2/16/00; 65 Fed. Reg. 7775	Busby et al. 1996; NMFS 1996
Columbia River Chum Salmon	Proposed-3/10/98; 63 Fed. Reg. 11774 Final-3/25/99; 64 Fed. Reg. 14507	Final-2/16/00; 65 Fed. Reg. 7774	Johnson et al. 1997

III. EVALUATING THE PROPOSED ACTIONS

The standards for determining jeopardy are set forth in Section 7(a)(2) of the ESA as defined by 50 CFR Part 402 (the consultation regulations). The NMFS must determine whether the action is likely to jeopardize the listed species and/or whether the action is likely to destroy or adversely modify critical habitat. This analysis involves the initial steps of (1) defining the biological requirements of the listed species, and (2) evaluating the relevance of the environmental baseline to the species' current status.

Subsequently, NMFS evaluates whether the action is likely to jeopardize the listed species by determining if the species can be expected to survive with an adequate potential for recovery. In making this determination, NMFS must consider the estimated level of mortality attributed to: (1) collective effects of the proposed or continuing action, (2) the environmental baseline, and (3) any

cumulative effects. This evaluation must take into account measures for survival and recovery specific to the listed salmon's life stages that occur beyond the action area. If NMFS finds that the action is likely to result in jeopardy, NMFS must identify reasonable and prudent alternatives for the action.

Furthermore, NMFS evaluates whether the action, directly or indirectly, is likely to destroy or adversely modify the listed species' critical habitat. The NMFS must determine whether habitat modifications appreciably diminish the value of critical habitat for both survival and recovery of the listed species. The NMFS identifies those effects of the action that impair the function of any essential element of critical habitat. The NMFS then considers whether such impairment appreciably diminishes the habitat's value for the species' survival and recovery. If NMFS concludes that the action will adversely modify critical habitat it must identify any reasonable and prudent measures available.

For the proposed action, NMFS's jeopardy analysis considers direct or indirect mortality of fish attributable to the action. The NMFS critical habitat analysis considers the extent to which the proposed action impairs the function of essential habitat elements spawning, rearing, feeding, sheltering, or migration of LCR steelhead and LCR spring chinook salmon, when compared to the existing environmental baseline.

A. Environmental Baseline

The environmental baseline represents the current set of basal conditions to which the effects of the proposed action are then added. Environmental baseline is defined as "the past and present impacts of all Federal, State, and private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or informal section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation process" (50 C.F.R 402.02). The term "action area" is defined as "all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action".

Wild Horse Creek flows into the Kalama River at river mile 19. The Kalama River is a tributary to the Columbia River. Lower Columbia River steelhead are known to spawn and rear in Wild Horse Creek. Lower Columbia River chinook salmon inhabit the Kalama River, and may occur in Wild Horse Creek. No surveys have been conducted for chum salmon in Wild Horse Creek.

The action area includes Wild Horse Creek from stream mile 0.0 to 0.3 and includes the Kalama River from river mile 17.0 to 19.0. The action area also includes the riparian area near the mouth of the creek and the area adjacent to the Kalama River where construction activities will occur.

Construction will begin on the earliest date possible and will last for up to five months. The duration of instream work is one month (personal communication, Roger Maurer, April 21, 2000), and likely will occur between July 15 and September 15, 2000.

The biological requirements of the listed species currently are not met. To improve the status of LCR chinook, LCR steelhead, and CR chum, significant improvements in the environmental conditions of designated critical habitat are needed.

The NMFS is informed of a myriad of factors that negatively influence current baseline conditions in the Kalama River Basin including timber harvest and road building. At present, ~96 percent of the Kalama watershed is in commercial forestry and owned by private companies. In the 1970's, extensive road building, logging, and removal of large woody debris degraded many subbasins within the Kalama River (Washington Conservation Commission 2000). The presence of dikes and rip rap along miles of river also likely reduced quality of habitat available for juvenile and adult salmonids. Fine sediments have embedded spawning substrates in areas of the main stem Kalama River (Washington Conservation Commission 2000). Additionally, the Kalama River was included on the Washington Department of Ecology 303(d) list of impaired waters as a result of elevated water temperatures.

The Washington Conservation Commission determined that there is a need for protection of critical habitat in the Kalama River Basin including the lower main stem river that contains spawning areas for fall chinook and chum salmon, the main stem river upstream of the lower falls, and tributaries located in the lower river. In the Kalama River, the five most productive tributaries for summer steelhead are believed to be Wild Horse Creek, Gobar Creek, Langdon Creek, Lakeview Peak Creek, and the North Fork Kalama River.

At present, habitat blockages resulting from anthropogenic activities reduce the amount of habitat available to salmonids. The box culvert that is located near the confluence of Wild Horse Creek and the Kalama River presumably is a barrier to adult salmonids during low flow conditions. Additionally, there may be an impassable culvert in Wild Horse Creek near stream mile 3.0 (personal communication, Randy Sweet, Environmental Consultant, April 25, 2000) that is located on commercial forestry land.

B. Status of the Species within the Action Area

1. Steelhead

Summer and winter steelhead inhabit the Kalama River. The upstream migration of summer steelhead is from early June through October and spawning occurs from mid-January to April.

Steelhead eggs may incubate for 1.5 to 4 months before hatching depending on water temperature (61 Fed. Reg. 41542; August 9, 1996). Bjornn and Reiser (1991) noted that steelhead eggs incubate about 85 days at 4°C and 26 days at 12°C to reach 50% hatch. Nickelson et al. (1992) stated that steelhead eggs hatch in 35 to 50 days depending upon water temperature. Consequently, adult, young-of-the-year, and juvenile steelhead may inhabit the action area.

From 1976 to 1985, annual counts of adult wild steelhead ranged from 188 to 764 fish in the Kalama River. From 1986 to 1990, escapement levels were estimated at 333 to 646 fish. Winter steelhead in the Kalama River migrate from November through April and spawn from early January to early June (WDFW 1992). Adjusted trap counts ranged from 391 to 1,009 steelhead from 1977 to 1991 (WDFW 1992). No surveys have been conducted in Wild Horse Creek since 1991, and therefore the status of salmonids upstream of the culvert remains unknown (David Evans and Associates 1999).

There is no tribal or direct commercial fishery on this stock although incidental catch of wild steelhead may occur in lower Columbia River gill-net fishery for spring chinook salmon (WDFW 1992).

2. Chinook

The Kalama River contains spring and fall chinook salmon. Spring chinook are native to the Kalama River (WDFW 1992). Historically, few spring chinook inhabited the Kalama River until the release of fish at the Kalama Falls Hatchery in 1959. Spring chinook are primarily distributed downstream of Kalama Falls Hatchery although some fish have been passed upstream in recent years. Adult chinook enter the river from March through July and spawn from mid-August to early October between the upper Kalama Falls Hatchery (RM 36.8) and the Lower Kalama Hatchery (RM 10.5) (WDFW 1992). Juvenile chinook may spend three months to two years in freshwater before migrations to the ocean. There was an average of 602 adult spring chinook in the river from 1980 to 1981. In 1982, 2,892 chinook were observed. No adults were found in 1985 (WDFW 1992). In 1999, chinook were released above Kalama Falls (COE 2000).
The upstream migration of fall chinook occurs from August to October and spawning occurs from October to November. Fall chinook extend to the Kalama Falls Hatchery unless fish are released upstream from the hatchery. From 1967 to 1991, annual escapements of chinook ranged from 1,259 to 24,549 fish (averaged 6,448 fish).

3. Chum

Chum are known to occur in the Kalama River. The proposed project occurs within the critical habitat for CR chum salmon although there have been no recent observations of chum salmon in

the Kalama River. Chum salmon may enter the Columbia River in September. It is unlikely that chum salmon inhabit Wild Horse Creek in the location of the project area.

IV. EFFECTS OF THE PROPOSED ACTION

The proposed removal of a culvert and replacement with a bridge is likely to adversely affect LCR chinook, LCR steelhead, and CR chum as determined by the COE. The ESA implementing regulations define "effects of the action" as "the direct and indirect effects of an action on the species or critical habitat together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline". "Indirect effects" are defined as those that are caused by the proposed action at a later time, but still are reasonably certain to occur (50 C.F.R 402.02).

A. Direct Effects

Direct effects are the immediate effects of the project on the species or its habitat. Direct effects result from the agency action and include the effects of interrelated actions and interdependent actions. Future Federal actions that are not a direct effect of the action under consideration (and not included in the environmental baseline or treated as indirect effects) are not evaluated. Juvenile and adult steelhead and chinook may inhabit the action area during the proposed construction periods. The period of instream construction also clearly overlaps with the spawn timing of spring chinook salmon. Generally, the direct effects are related to the extent and duration of construction activities in the water (30 days). Any direct, negative effects from the proposed project likely will be short in duration and occur in a relatively localized area. The proposed action is a one time event that is not expected to be repeated for at least the design duration of the bridge (100 years).

1. Removal of Vegetation

The removal of 20,085 square feet of trees and shrubs within the riparian area will adversely effect critical habitat. Riparian habitats are one of the most ecologically productive and diverse terrestrial environments. The area adjacent to the river links terrestrial and aquatic ecosystems, influences channel processes, contributes organic debris to streams, and modifies water temperatures (Gregory 1991). Any increases in water temperature as a result of removal of trees would further degrade already impaired water temperatures in the Kalama River.

To replace lost function of that portion of riparian area, all disturbed areas will be revegetated with native conifers, native deciduous trees, and shrubs at a 5:1 ratio (newly planted to removed).

Additionally, mature trees removed during construction will be placed adjacent to the Kalama River for retention of woody debris in the system. Replanting native conifers in the riparian area may result in a net benefit to the action area despite the temporal loss of more mature trees at the site.

2. Dewatering of Stream

Direct effects may occur during the dewatering of Wild Horse Creek. The dewatering of 2,520 square ft of area could affect fish in the following ways: 1. fish in the dewatered section may die; 2. fish will be excluded or displaced from habitat located within the dewatered section; 3. the diversions may result in barriers to upstream or downstream movements by adult and juvenile salmonids; 4. redds within the dewatered portion could be destroyed ; and 5. fish may be injured during capture and handling or piping of water.
Direct effects associated with dewatering should be minimized by timing restrictions discussed in the Reasonable and Prudent Measures. The portion of stream that will be dewatered is not believed to be suitable spawning or rearing habitat, particularly since most of the area occurs within the boxed culvert. Although the timing of construction may overlap with the adult steelhead migration and the onset of spring chinook spawning, relatively low water flows currently inhibit upstream passage of adults into the creek.

3. Excavation and Removal of Culvert

Excavation could result in deposition of fine sediments into the stream that degrade spawning habitat for salmonids. Specifically, the instream construction may influence spring chinook spawning within the action area in the Kalama River. Increased sedimentation may reduce survival of steelhead and chinook from egg to emergence (Phillips et al. 1975). Survival of steelhead and chinook eggs generally is inversely related to percentage of sediments in the gravel (Reiser and White 1988).

Sublethal effects associated with siltation include physiological stress and reduced growth. High concentrations of suspended sediments also may result in avoidance by juvenile salmonids (Bisson and Bilby 1982). Elevated turbidity levels reduce the ability of salmonids to detect prey and may cause gill damage (Sigler 1980; Lloyd et al. 1987). Moderate turbidity levels (11-49 NTU's) may cause juvenile steelhead and coho to leave rearing areas (Sigler et al. 1984). The effects from the excavation and culvert removal are expected to be relatively short in duration. Any negative effects may be minimized through erosion and sediment control at the site (Best Management Practices), awareness of the distribution of redds in the action area, and adherence to the recommended timing for construction.

Equipment driven in the stream during excavation may harm fish or eggs or cause disturbance of the streambed. Construction workers wading in the river also may trample eggs (see Roberts and White 1992). The County does not intend to operate equipment in the wetted stream channel.

4. Installation of Rip Rap

The adverse effects from installation of rip rap are expected to be relatively localized in the lower most portion of Wild Horse Creek. It remains unclear how the proposed project may influence fish densities at the site of rip rap since that portion of creek appears to serve more as a migratory corridor than as juvenile rearing or adult holding areas. Generally, salmonid densities appear to be lower adjacent to stabilized banks than natural river banks (Knudsen and Dilley 1987; Li et al. 1984). Recently, researchers in western Washington suggested that fish densities typically are lower at stabilized banks except when large woody debris is incorporated into the design (Peters et al. 1998). Other results indicate that the influence of bank stabilization on juvenile salmonid densities differ by season, fish species, and stabilization method and material (Knudsen and Dilley 1987; Li et al. 1984; Lister et al. 1995). To reduce effects associated with installation of rip rap**,** willows will be planted into the toe of the rip rap. Willows may provide cover for juvenile fish and may increase hydraulic complexity.

5. Benefits to Migratory Salmonids

The removal of the culvert and installation of the bridge will significantly increase the amount of habitat available to salmonids (three to up to nine miles) in Wild Horse Creek (personal communication, Randy Sweet, April 25, 2000). A bridge designed to pass a 100-year peak flow will allow more unrestricted movement of woody debris from the creek into the Kalama River. In the long term, the installation of the bridge will reduce constriction of the channel during high flow events when compared to existing baseline conditions. The replacement of the culvert also will increase the wetted area of the stream channel from 900 square feet (inside box culvert) to 2,400 square feet (new channel). Additionally, revegetation of areas where trees were removed may maintain riparian conditions over the long term or possibly improve conditions based on the 5:1 replanting ratio outlined in the Reasonable and Prudent Measures.

B. Indirect Effects

Indirect effects are caused by or result from the proposed action, are later in time, and are reasonably certain to occur. Indirect effects may occur outside of the area directly affected by the action. Indirect effects may include other Federal actions that have not undergone section 7 consultation but will result from the action under consideration. These actions must be reasonably certain to occur, or they are a logical extension of the proposed action.

Indirect effects of increased impervious surface on water quantity are expected to be negligible when compared to existing impervious conditions in the action area. The net increase in impervious surface of 4,300 square feet likely will not cause physical disruption of the stream channel through lateral erosion, channel widening, bed scour, incision, or changes in water quality. Instead, storm water runoff should drain into a vegetated ditch and swale before entering into the creek. Finally, the design of the project was not intended to increase vehicular traffic.

C. Effects on Critical Habitat

The proposed actions will affect essential features of the designated critical habitat for LCR chinook, LCR steelhead, and CR chum. The NMFS designates critical habitat based on physical and biological features that are essential to each listed species. Essential features for designated critical habitat include stream substrate, water quality, water quantity, water temperature, water velocity, food, riparian vegetation, access, and safe passage conditions for fish. Of these essential features, NMFS determined that the removal of the box culvert and installation of a bridge may influence water quality, water quantity, water temperature, riparian vegetation, and passage conditions.

D. Cumulative Effects

Cumulative effects are defined as "those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation" (50 C.F.R 402.02). Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

The NMFS is not aware of any federal projects within the Wild Horse Creek Basin. The NMFS assumes that non-Federal land owners in the project area will take steps to minimize or avoid land management practices that would result in the take of LCR steelhead, LCR chinook, and CR chum ESU's. Such actions are prohibited by section 9 of the ESA, and subject to the incidental take permitting process under section 10 of the ESA. Future Federal actions, including the on-going operation of hatcheries, harvest, and land management activities will be reviewed through separate Section 7 consultation.

V. CONCLUSION

The NMFS concludes that the proposed action is not likely to jeopardize the continued existence of LCR steelhead, LCR chinook, CR chum, SW/LCR coho or result in the destruction or adverse

modification of designated critical habitat. The determination of no jeopardy was based on the current status of each species, the environmental baseline for the proposed action area, and the effects of the proposed action.

The NMFS expects that the installation of a bridge will significantly improve passage conditions for migratory salmonids in Wild Horse Creek. There may be short term direct impacts, and NMFS anticipates that there is a more than negligible likelihood that incidental take will occur during the instream work. The direct and indirect effects will be minimized through the use of Best Management Practices in the design and construction of the project. The proposed activities will not appreciably reduce the likelihood of survival and recovery of LCR steelhead, LCR chinook, and CR chum.

VI. REINITIATION OF CONSULTATION

This concludes formal consultation for the Wild Horse Creek Bridge Project. Construction must cease and consultation must be reinitiated if: the amount or extent of taking specified in the Incidental Take Statement is exceeded, or is expected to be exceeded; new information reveals effects of the action may affect listed species in a way not previously considered; the action is modified in a way that causes an effect on listed species that was not previously considered; or, a new species is listed or critical habitat is designated that may be affected by the action (50 CFR § 402.16).

VII. INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulation pursuant to section 4 (d) of the Act prohibit the take of endangered and threatened species without special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct of listed species without a specific permit or exemption (50 C.F.R 217.12). "Harm" is further defined by the NMFS Final Rule to include significant habitat modification or degradation that results in death or injury to listed species by "significantly impairing behavioral patterns such as breeding, spawning, rearing, migrating, feeding, and sheltering" (64 Fed. Reg. 24148). "Harass" is defined as actions that created the likelihood of injuring listed species to such an extent as to significantly alter normal behavior patterns which include, but are not limited to breeding, feeding, and sheltering. Incidental take is take of listed animal species that results from, but is not the purpose of, the Federal agency or the applicant carrying out an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to, and not intended as part of, the agency action is not considered prohibited taking provided that such takings is in

compliance with the terms and conditions of this incidental take statement.

An incidental take statement specifies the impact of any incidental taking of endangered or threatened species. It also provides reasonable and prudent measures that are necessary to minimize impacts and sets forth terms and conditions with which the action agency must comply in order to implement the reasonable and prudent measures.

A. Amount or Extent of Take Anticipated

The NMFS anticipates that the proposed actions may result in incidental take through harm and harassment of juvenile and/or adult salmonids. Increased levels of sediment, dewatering of the stream, installation of rip rap, and removal of riparian vegetation may constitute direct incidental take under the ESA. The exact numerical amount of expected take is difficult to determine, and therefore has not been quantified. The extent of take is limited to within the action area.

B. Reasonable and Prudent Measures

The NMFS believes that the following reasonable and prudent measures are necessary and appropriate to minimize incidental take of LCR chinook, LCR steelhead, and CR chum:

1. All in-water work shall be completed between July 15 and September 30, 2000.

2. All trees and any attached root wads that are removed from the project area shall be placed adjacent to the Kalama River in the vicinity of the project area. Photo documentation will be provided to NMFS including pictures of the location and orientation of each tree.

3. The applicant shall increase the number of each species to be planted to account for the temporal loss of mature trees. The following trees and shrubs shall be planted at a 5:1 ratio (newly planted to removed): alder; spruce; cedar; fir; hemlock; alder; and maple.

4. Trees and shrubs shall be guaranteed for five years after planting. Plant material shall be alive and in good health by the end of the guaranteed period. The applicant shall replant trees to account for any mortalities that occur throughout the five year period.

5. Effective erosion control measures shall be in-place at all times during the contract and will be routinely inspected throughout the project. Construction within the five-year floodplain will not begin until all erosion control structures are in-place.

6. Rip rap shall be clean, angular rock that will be able to withstand 100 year peak flow events. Willow stakes and other riparian vegetation shall be planted in the rip rap to provide shade and cover.

7. A fishery biologist shall conduct redd surveys in Wild Horse Creek from the mouth to a point 200 feet upstream. Surveys also should be conducted in the Kalama River from the confluence of the creek downstream 0.25 miles. Redd surveys shall occur one to seven days before the onset of construction and at least weekly during the period of construction. If redds are observed in the action area, all work within the ordinary high water mark shall temporarily cease until NMFS staff is notified of the location and number of redds. Upon notification of NMFS, the applicant shall continue construction in a manner that will avoid impacts to the redds.

8. Construction equipment shall not enter the water.

9. Overburden material from the excavation will be secured off-site in a location outside the 100-year floodplain of any stream or river.

C. Terms and Conditions

To comport with ESA section 7 and to be exempt from the prohibitions of ESA section 9, the applicant must comply with the terms and conditions that implement the reasonable and prudent measures. There terms and conditions are non-discretionary.

1. All conservation measures proposed by the applicant shall be fully implemented at the appropriate phases of construction.

2. The applicant shall comply with the all of the terms and conditions of the Hydraulic Project Approval and any provisions outlined by WDFW biologists. One exception is that work below the ordinary high water mark shall occur from July 15 to September 15 (not September 30).

3. The Reasonable and Prudent Measures that were described above shall be fully implemented into the project design and appropriate phases of construction.

4. The applicant shall reinitiate consultation with NMFS if deleterious effects occur during the construction of the project.

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ATTACHMENT A
Hydraulic Project Approval